# *Canada's rate of warming called double global average; 'Urgent action' needed to limit future warming, says researcher behind new Canadian report*

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## Body

Canada is warming faster than the world average from human-caused climate change, and global efforts to cut carbon emissions can now only mitigate how much damage is expected to be done.

That is the broad conclusion of a new report from Environment and Climate Change Canada, the first in a series from federal government scientists who drew on peer-reviewed studies to survey how climate change is affecting Canada now and through the 21st century.

The report estimates the average annual temperature across Canada has jumped by 1.7 degrees Celsius since 1948 - more than twice the global average increase of 0.8 C during that time - and that temperatures are expected to keep rising for at least the next two decades, regardless of efforts to slash greenhouse gas emissions that cause climate change.

Even if countries around the world stick to their commitments under the 2016 Paris Agreement, the report says Canada is still likely to experience a range of consequences like rising sea levels, shrinking glaciers and Arctic ice cover, increased risk of summertime water shortages and more frequent droughts, floods and wildfires.

"It's important to recognize that additional warming is unavoidable and associated changes in climate will be experienced," Elizabeth Bush, climate science adviser with Environment Canada's climate research division, told reporters during a briefing on the report Monday.

"We are already seeing the effects of widespread warming in Canada," Bush said. "Urgent action is needed to reduce emissions ... if we are to achieve this limited warming future."

The report lands amidst ongoing political opposition to the federal government's national climate change plan. The plan includes a tax on fuel that kicked in Monday in four provinces that failed to create their own carbon price systems that met a minimum standard set by Ottawa. Conservative politicians greeted the milestone by arguing the policy is unnecessary, unfair to most Canadians and will hurt the economy. Ontario Premier Doug Ford, who was filmed for his Instagram account gassing up this weekend, called it "the worst tax ever."

The governing Liberals point to the conclusions of a broad range of economists and environmental advocates, who say pricing carbon emissions is the best way to spur a shift to cleaner technologies and energy use as countries around the world seek to avoid the worst consequences of climate change this century.

Last October, the United Nations Intergovernmental Panel on Climate Change issued a report that called for "unprecedented changes in all aspects of society" if the world is to keep global warming below the Paris Agreement

target of 1.5 C by 2100. The report said global greenhouse gases will need to fall by about 45 per cent below 2010 levels within the next 12 years, and reach "net zero" by 2050 - a conclusion echoed in Tuesday's publication from Environment Canada.

"It's going to be a huge challenge, but it's going to be a scale of challenge that we have faced at other points in human history," said Catherine Abreu, executive director of Climate Action Network Canada, pointing to efforts to transform the Canadian economy to support the world wars in the last century.

"What this report makes very clear to me is that climate change is a Canadian problem, just like it's a global problem."

Dale Marshall, national climate program director with the advocacy group Environmental Defence, said the report effectively underscores what's at stake in the years ahead.

"When you look at it in one place, and you look at access to water and droughts and extreme weather ... over and over again, all these different real impacts on real people are going to get worse across the board, and we decide whether it's going to be a little bit worse or a lot worse," he said.

"We are basically the decision-makers around whether we act decisively and address climate change, or whether we just sit on our hands."

Here are some other key conclusions from "Canada's Changing Climate Report":

It's getting hotter everywhere in Canada - especially in the North

If countries around the world reduce emissions in line with the Paris Agreement - the United States, the world's second-largest carbon emitter, announced its withdrawal in 2017 - the report predicts Canada's average annual temperature will stabilize between 2081 and 2100 at about 1.8 C warmer than average temperatures during the "reference period" of 1986 to 2005. That's compared with a "high emission scenario" where emissions continue to rise in the coming decades, leading to an average national temperature increase of 6.3 C above the reference period.

The report finds that Canada has already warmed by 1.7 C since 1948 - the first year national data was available - while Northern Canada has warmed by 2.3 C. This warming has already led to decreased snow cover, shrinking glaciers and Arctic Ocean ice cover, and warming permafrost "at rates not seen for thousands of years," Environment Canada research scientist Chris Derksen said.

Further changes to ice cover, snow and permafrost are "virtually certain" in the coming decades, including the disappearance of most Arctic sea ice during at least one summer month by 2050, the report says. And even under a medium emissions scenario, the report projects that "most ice caps and ice shelves" in the Canadian Arctic will disappear by 2100.

Expect more extreme weather

Climate change is already changing weather extremes in Canada, making the hottest days hotter and the coldest days less cold, the report says. It predicts "extreme hot temperatures will become more frequent and more intense," while heavier rainfall is expected to increase the risk of flooding in cities. For example, under the low-emissions scenario, the highest daily temperature that currently occurs every 20 years on average is projected to occur every five years. With "medium confidence," the report concludes that drought and soil moisture deficits will become more frequent in the Prairies and interior of British Columbia by 2100, under the high-emissions scenario.

The report also cites several studies that concluded climbing average temperatures have increased the likelihood of extreme weather events like the 2015 drought in Western Canada, heavy rainfall that contributed to flooding in Alberta in 2013, and the massive wildfire that decimated Fort McMurray in 2016. The report also predicts freshwater

shortages in the summer will become more likely, especially where basins rely on glacial runoff and annual snow thaw.

Sea levels are rising - especially in Atlantic Canada

The report predicts oceans will rise on the Pacific and Atlantic coasts - it just depends by how much. Even under the scenario where global emissions are slashed to meet the Paris targets, sea levels in places like Halifax would rise by 45 centimetres by the end of the century, said Blair Greenan, a scientist with the ocean stressors and Arctic science section of Fisheries and Oceans Canada.

Under the high-emissions scenario, sea levels are expected to rise by as much as one metre in northern B.C., Nova Scotia, New Brunswick, Prince Edward Island and the east coast of Newfoundland, and as much as 50 centimetres in southern B.C. and much of the St. Lawrence River, the report says

Higher sea levels put coastal regions at greater risk of flooding from storm surges that could damage infrastructure and ecosystems, the report says,

At the same time, climate change is causing average ocean temperatures around Canada to rise, become more acidic and less oxygenated, the report says.

Greenan said this could impact the ability of marine life to form shells, and propel some animals to more northern habitats in search of the cooler waters they prefer.

The path forward

The report doesn't recommend policies to avoid the worst consequences of climate change, but its authors said during Monday's briefing that it is clear that Canadians and their governments need to prepare for the impact of rising average temperatures.

Canada's current target under the Paris Agreement - which government projections from December say the country is on track to miss - is to slash emissions to 30 per cent below their 2005 level by 2030.

"We are on a warming trajectory. We are looking at warm or warmer, which means that there are choices ahead of us," said Marjorie Shepherd, director of the climate research division at Environment Canada.

"We are hopeful that the best information we have will empower the most effective action, because emission reductions anywhere have an impact everywhere."

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